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ABSTRACT

Curriculum knowledge cannot be legitimized until its method of construction is examined. Dominant curriculum theories, those that are well established by tradition, usually provide research results reflecting a deterministic or imposed reality. The basic premise of this paper is that curriculum theorizing has, for the most part, been a utilitarian act involving literal translation of theory into practice. The intent of this paper is to explore the nature of theory making, alternative world views and concomitant conceptual tools, and the potential impact that an emerging paradigm could have on curriculum theorizing. Forty references and one footnote are included. (Author/JD)

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Emerging Paradigm for Curriculum Theorizing

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Abstract

Curriculum knowledge cannot be legitimized until its method of construction is examined. Dominant curriculum theories, those that are well established by tradition, usually provide research results reflecting a deterministic or imposed reality. The intent of this article is to explore the nature of theory making, alternative world views and concomitant conceptual tools, and the potential impact that an emerging paradigm could have on curriculum theorizing.

Curriculum Theorizing: Toward an Emerging Paradigm

In 1987 we wrote:

> Ideas, unformed conceptions, are inventions of humans. Curriculum theorists conceive, as well as collect, ideas from other disciplines and arrange them into various structures in order to create concepts unique to the field of curriculum. These concepts exist in human minds and are used not only to affirm reality but also as intellectual tools to create curriculum knowledge. Thus, if curriculum theory is a synthesis of selected ideas, if ideas are the inventions of humans, and if these inventions have multiple sources, then the epistemological bases of curriculum theory are diverse perceptions of reality. This diversity has led to a progressively widening philosophical split in the ranks of curriculum theorists, resulting in definite trends in theory construction (Dobson & Dobson, 1987, p. 275).

Although written several years ago, our thinking about this matter has not changed but has intensified due, in part, to exposure to a constant rhetoric about a crisis and reform in America's schools. The present educational age can be characterized as one in which the major function of curriculum theorists is to seek and provide answers to contrived dilemmas.

Crises are not necessarily natural phenomena but occur because of certain contextual conditions. These contextual conditions have been referred to in the literature as paradigms (Kuhn, 1970), mindscapes (Sergiovanni, 1985), perspectives (Schubert, 1986), contextualism (Pepper, 1942), or more commonly as world view. Contextual conditions that serve to give form to diverse realities have historical and epistemological roots (Kliebard, 1986). To perform a theorizing function is to suscribe to a particular world view which is to endorse a particular set of values. As Zukav (1979) comments:

> Reality is what we take to be true. What we take to be true is what we believe. What we believe is based upon our perceptions. What we perceive depends

> upon what we look for. What we look for depends upon what we think. What we think depends upon what we perceive. What we perceive determines what we believe. What we believe determines what we take to be true. What we take to be true is our reality (p. 328).

"The way we know has powerful implications for the way we live" (Palmer, 1989).

Curriculum knowledge cannot be legitimized until its method of construction is examined, for product is the result of its process. Many curriculum theories and most curriculum reform proposals have been offered without coherent or sufficient context (Foshay, 1986).

Dominant curriculum theories, those that are well established by tradition, usually provide research results reflecting a deterministic or imposed reality. Deterministic realities are at best representations or approximations of the real thing. This in itself is neither good nor bad. The danger lies in the approximation being endorsed as a reasonable substitute for essence.

The basic premise of this paper is that curriculum theorizing has, for the most part, been a utilitarian act involving literal translation of theory into practice. This act is an exercise in "confirmation bias": a tendency of theorists to posit hypothesis using strategies that confirm rather than disconfirm their expectations (Conant, 1947; Kuhn, 1970; Snyder & Gangstead, 1981; Taylor & Crocker, 1981). Accordingly, the intent of this article is to explore the nature of theory making, alternative world views and concomitant conceptual tools, and the potential impact that an emerging paradigm could have on curriculum theorizing.

The Nature of Theory Making

It is posited that there are two overarching approaches to theorizing or the construction of knowledge; rational and nonrational[1]. Advocates of various theoretical camps, which ultimately fall into one or the other of these broad categories, tend to champion their point of view by treating other points as erroneous (Mindell, 1985). The intention is to simplify matters in order to get the job done.

Traditionally, the mode of knowing that dominates curriculum theorizing is rational. Rational thinking is

linear, focused, and analytic belonging to the realm of the intellect whose function it is to discriminate, measure, and catego ize. As a result, rational knowledge tends to be fragmented; dealing with particulars out of context.

On the other hand, there is emerging from the nonrational, an epistemology that may provide entirely new interpretive tools for the curriculum theorist. This epistemology has been known by natural scientists since the early part of the century (Bohr, 1958; Einstein, 1950; Hiesenberg, 1966) and is more wholistic and less mechanical than that portrayed by the rational (Schopen, 1989). This epistemology presents a world of ". . . infinite varieties and complexities, a multidimensional world which contains no straight lines or completely regular shapes, where things do not happen in sequences, but all together" (Capra, 1982, p. 15).

One's view of the nature of knowledge, how it is created and its utilitarian function is reflective of one's window of reality (Sergiovanni, 1985). In order to reflect intellectual integrity and to communicate, curriculum theorists must be aware and publicly opt for a coherent window of reality. Not to do so is to commit

category error (Wilber, 1977) which is an attempt to communicate rational knowledge at the nonrational level or nonrational knowledge at the rational level. As Roberts (1976) succintly states, "It is impossible to practice the ideas of Skinner and Chomsky simultaneously" (p. 321). In spite of good intentions curriculum theorists cannot easily make congruent that which is incongruent.

Models, Paradigms, and Metaphors

The contextual conditions available to curriculum theorists in their attempts at contriving and communicating reality are models, paradigms, and metaphors. All three conditions are reflective of a particular cultural mindset or world view.

Models and paradigms. Model building is the dominant mode of curriculum theorizing; the activity of building replicas of perceived reality. This was implied by Beauchamp (1981) when he stated, ". . . they basically are either replicas of a set of laws or events, or they represent the set of laws symbolically" (p. 29). Schubert (1986) contends that, ". . . a model should be able to be discussed in terms of assumptions, essential characteristics or attributes, supportive

theory, research, and practical precedent" (p. 249). Based on the presumptions of Beauchamp and Schubert, it seems reasonable to suggest that models are static and consequently, treat reality as fixed. Models have specific parameters which govern their range, effectiveness, and applicability, thus providing parameters for thought construction that are relatively limited and rigid.

An assertion can be made that curriculum models, generally, follow a linear sequential format of steps or stages to fulfill their mission. "Each successively builds upon the previous one and, when completed, the cycle begins again in a deterministically 'closed' process" (Brown, 1989, p. 71). These curriculum models, more often than not follow a technical tradition and are well suited to classical scientific research.

The base for an alternative way of thinking about ourselves and the world (a new epistemology) was advanced with the introduction of the concept of paradigm shift (Kuhn, 1962). Ferguson (1980) describes paradigm as a framework of thought while Schubert (1986) contends that paradigms are the ". . . conceptual lenses through which curriculum problems are perceived" (p. 2).

Capra (1982) views paradigm as the ". . . thoughts, perceptions, and values that form a particular vision of reality" (p. 16). To Kuhn (1970), a paradigm ". . . is an object for further articulation and specification under new or more stringent conditions" (p. 23). A paradigm, therefore, is not as rigid as a model. Brown (1988) argues that a paradigm never explains all the facts with which it can be confronted (p. 13). "Paradigm can guide research even in the absence of rules; the lack of a standard interpretation or of an agreed reduction to rules will not prevent a paradigm from guiding research" (Kuhn, 1970, p. 42). ". . . the very concept of paradigm raises our awareness to more than one dominant way of seeing things" (Foster, 1986, p. 55).

Whereas models contain rules, paradigms do not. Paradigms provide a vision or a path not a direction. According to (Kuhn, 1970), rules derive from paradigms; they are not contained within them. A model contains assumptions about certain phenomena in order to legitimate its intentions. A paradigm legitimizes its intentions through its acceptance by a community of practitioners.

Beauchamp (1981, p.28) distinguishes between a paradigm and a model; ". . . a paradigm is a framework borrowed from its field of origin and subsequently used in a different field of endeavor; whereas, a model is a representation of a specific set of events about which a theory is being developed." Models serve functions such as representation, rules of inference, interpretation and visualization (Fattu, 1965).

For the most part models are practical, utilitarian interpretations of a reality derived from classical science (rational world view) (Brown, 1989). Paradigms, on the other hand, are given to more illusive parameters, less rigid guidelines and wholistic thinking, they tend to be more open-ended, yet at the same time provide a framework for emerging reality and the act of theorizing. Process is an important function of paradigms.

Metaphors. That discourse is a fundamental activity of curriculum theorizing is well established; the relationship between theorizing and language seems to be a reciprocal arrangement. Causal priority does not seem to be important. To understand curriculum reality requires deep examination of language as the

tool of discourse. Huebner (1966) believes that, ". . . the curriculum worker is locked into a language system which determines his questions as well as his answers" (p. 12). He continues that, ". . . the curriculum worker must confront his reality directly, not through the cognitive spectacles of a particular language system" (p. 12). Dewey (1933) contended that ". . . thought deals with the meaning of things; and since meanings are not tangible they anchor themselves in language for existence; language selects, preserves, and applies specific meaning" (p. 233).

Sergiovanni (1985) emphasizes that, ". . . theoretical and practical mindscapes are expressed through the language systems humans use, which, in turn, reinforce our mindscapes" (p. 7). Metaphors provide the setting for curriculum theorizing, thus providing a mental image. Obviously, different metaphors have the power to illicit different realities or mindscapes (contexts). Metaphors used for reality construction from the prevailing mode of curriculum theorizing, (rational thought based in a Cartesian tradition of scientific research), encourages a priori knowledge.

"The questions we ask determine finally the answers we get" (Ponder, 1986, p. 34).

Fry (1989) establishes that, ". . . language provides the conceptual categories to organize and communicate thoughts concerning reality" (p. 8). She continues, "The generation of a metaphor is a means of perceiving, structuring, and communicating one's reality. It may be considered a theorizing process." (p. 9). We postulate that curriculum theorizing is a function of reality construction using either model building or paradigmatic speculation as intellectual context. Metaphor is a tool for ordering and communicating the reality form.

A Lesson From Natural Scientists

A new world view is emerging, one that is less deterministic and more evolutionary. The metaphor of God as a clockmaker could be replaced by God as a pinball player. The premise shift in the conceptual base for explaining curriculum reality will be the role, and concommitant influence, of the observer in the observer-observed relationship (Bohr, 1958; Einstein, 1950; Hiesenberg, 1966). Jantsch's (1975) metaphor of stream projected by Haggerson (1988) is useful in

interpreting the multiple realities available to curriculum theorists (observers). In the first image of the observer, the researcher stands back from the stream observing, measuring, counting, and in some instances manipulating. "The researcher is the objective knower of the stream, the known reality" (p. 84). The second image places the researcher in a boat in the stream. The kind of boat, the researcher's size and strength, affect the stream, as do qualities of the stream affect the research i.e. the rate of flow of the stream can provide the researcher with a tranquil or exhilerating experience. In any event, the relationship is complimentary and simultaneous, certainly allowing for some nonrational qualities. "The third image of the stream finds the researcher as one with the stream, it transcends the feedback relationship" (p. 87). As the observer- observed relationship merge, one cannot be measured or described exclusive of the other. A new reality is emerging, one of unifying wholeness based in the nonrational. One becomes one's brother instead of one's brothers keeper; thus a new reality for the curriculum theorist.

The dominant reality for curriculum theorists (first image) has its tradition in Kants' passion for causality and Newton's mechanistic view of the universe where all the pieces come together as cogs in a cosmic machine or a giant clock. Palmer (1989) views this mode of knowing as possessing three traits; (a) objective, (b) analytic, and (c) experimental. Objectivity is a distancing condition which protects knowledge from contamination by subjective prejudice and bias. The observer is a spectator of a world. Once objectivity is established, through distancing, the second trait of analysis can be applied which is dissection; the separation of problems into their smallest components. The third trait is experimental. Once the phenomena under study has been neutralized through objectivity, and dissected by analysis, the theorist/researcher is free to move the pieces around to fit into a preconceived frame. This approach to theorizing too often attempts "...to force nature into a relatively inflexible box" (Kuhn, 1970, p. 24). Mindell (1985) sees this attempt of theory-matching as emanating from an interpretation of scientific research couched in the "... idea of a fixed state, which is a static picture,

an unchanging description of a situation which has been broken up into parts" (p. 11). In this tradition of theorizing, a function of model building, theorists are expected to act as if they had no presence in their work. Hiesenberg (1958) suggests, "What we observe is not nature itself, but rather nature exposed to our method of questioning" (p. 81).

As mentioned earlier, in his now classical work, Kuhn (1962) introduced into the literature the notion of paradigm shift which impacted ways of thinking about ourselves and the world. The full meaning of this concept is yet to penetrate the field of curriculum theorizing. For Kuhn, a paradigm is the metaphysics that guides aims and activities (research) of the community (i.e., leaders of the field). "A paradigm stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community" (p. 175). Traditionally, a science community has as its goal the practice of normal science, a rule-bound mode of investigation that seeks to validate theory. Extraordinary events that arise in studies tend to be suppressed by investigators. When the novelties or anomalies appear to a degree they can no longer be

ignored nor accounted for according to research design, the community is led to a "new set of commitments, a new basis for the practice of science" (p. 6). Kuhn (1970) describes this as the process that leads to scientific revolutions:

> The extraordinary episodes in which that shift of professional commitments occurs are the ones known in this essay as scientific revolutions. They are the tradition-shattering complements to the tradition bound activity of normal science (p. 6).

When scientific paradigms change, the world itself changes with them. "A paradigm shift is a distinctly new way of thinking about old problems" (Ferguson, 1980, p. 6). "The abandonment of Newtonian mechanics as a paradigm for understanding reality is relatively well advanced" (Lucas, 1985, p. 165).

An Emerging Curriculum Reality

According to Lucas (1985) the earliest challenge to normal science came at the beginning of the twentieth century with revolutionary discoveries by Einstein, Heisenberg, and Bohr (among others) who founded the

theories of relativity, uncertainty, and complementarity as they formed the genesis of quantum theory. Schopen (1989) notes that taken together, these discoveries refute the "mechanical model" of old science ". . . with the recognition that the physical world could not be separated into independently existing elements or isolated entities" (p. 11). This changing world view could provide a shift in the contextual conditions in which curriculum theorizing/research is conducted. "When context changes, meaning changes" (Clark, 1988, p. 19). A shift from model building to a paradigmatic posture would allow curriculum theorists to interact with schooling as an evolutionary, relational, networking, unfolding, dynamic unity as opposed to a state-oriented or fixed entity. This possible shift in the observer-observed relationship could result in different interpretations of curriculum reality. As of yet, however, a direct application of new science theory to curriculum knowledge construction has not been made.

Einstein's theory of general relativity focused on the behavior of subatomic particles which float about the nucleus of an atom. These subatomic particles can have the dual nature of both wave and particle depending

upon how they are observed. As a particle, the entity is confined to a small space, whereas when viewed as a wave, the entity may be spread across a vast region. "The properties of a particle can be understood only in terms of its activity -- of its interaction with the surrounding environment -- and that the particle therefore, cannot be seen as an isolated entity, but has to be understood as an integrated part of the whole" (Capra, 1980, p. 69). Thus particles are understood in terms of their activity.

While the formula remains the same, it is the problem and the interpretation that differ; thus, it is the human doing the perceiving that actually makes the difference. Therefore, Einstein (1950) asserts ". . . we must make up our mind to accept the fact that the logical basis departs more and more from the facts of experience" (p. 96). According to Einstein, the theory of relativity demonstrated that ". . . simultaneity was relative and depended upon the frame of reference" (p. 105) of the perceiver. This new discovery freed physics from the classical notion that "independent physical properties" had to be concealed in "an inertial system" (p. 106), a system at rest, in order to be studied.

According to Weisskopf (1972) the greatest value of Einstein's theory rests with the fact that the quantum state forms an "invisible whole" until it is ". . . attached by penetrating means of observation" (p. 120). The quantum state is the state of the system at equilibrum where the atom adjust(s) itself to the conditions of low energies. Here the atom's movement spreads throughout the region in the form of a wave. Because the atom cannot be observed in its precise movements, the quantum state reveals only an approximate location of the atom, either at rest as a particle, or in flux as a wave moving about the spread of the region. Since ". . . the exact point cannot be predicted with accuracy" (p. 121), Heisenberg's uncertainty principle becomes important.

Hiesenberg's uncertainty principle deals with the uncertainty of position and momentum of a particle in the subatomic world. Dynamic entities cannot be isolated and measured with precision (as classical scientists would have it): Scientists must deal with probability spreads and obtain only an approximation of reality. The Hiesenberg uncertainty relationship implies that we cannot simultaneously establish both

position and momentum of a particle with great accuracy. Determining future trajectory is not a possibility. The better we know the position, the hazier will its momentum be and vice versa. "While we are attempting to undertake a precise measurement of one of the two quantities the actions of the other escapes our intellectual scheme. This limitation is not due to the imperfection of measuring techniques, but is a limitation of principle" (Capra, 1982, p. 143). As Hiesenberg remarked, the uncertainty in position and momentum are like ". . . the man and the woman in the weather house. If one comes out the other goes in" (Pagels, 1982, p. 71).

While Hiesenberg was developing his uncertainty principle mathematically, Bohr was working on his notion of complimentary from a more philosophical vein. "Their combined efforts culminated in what is referred to as the 'Copenhagen interpretation': that observation can change what is being observed" (Pagels, 1982, p.73).

Bohr was concerned that the available language base was inadequate to interpret quantum theory, since it was so far removed from human experience. He remarked, "It is wrong to think that the task of physics is to find

out how Nature is. Physics concerns what we can say about Nature." (as reported by Pagels, 1982, p. 73). Bohr presented a defensible argument that the outcome of an experiment was dependent upon the experimental arrangement, and different experimental arrangements are necessary to measure the position and wave length of an electron. "Particle and wave are what Bohr called complimentary concepts, meaning they exclude one another" (Pagels, 1982, p. 75). There are complimentary properties to be known of the same object of knowledge; the knowing of a property is a matter of human choice and experimental apparatus, e.g., wave or particle. Bringing a particular property to focus through theorizing/research efforts, tends to blur if not entirely exclude other properties. To know a property fully is to know other properties partially, thus reality formation is an act of exclusion not inclusion. Knowledge is always incomplete and limited.

Pagels (1982) identifies two crucial points that emerge from the work of Hiesenberg and Bohr: "(a) quantum reality is statistical, not certain, and (b) it is meaningless to talk about the physical properties of quantum objects without precisely specifying the

experimental arrangement by which you intend to measure" (p. 76).

Conceptual Tools.

The movement of theorists from one condition of thought to another (paradigm shift) is transformation; the act of embracing and using different, often antithetical, ways of knowing. Earlier in this article we presented a distinction between model and paradigm as contextual tools used for framing the conditions for theorizing. Once the theorizing function has been contextualized using either a model or paradigm, there are certain concepts available which theorists use in constructing knowledge. If theorists are working within the context of a model (Newtonian science) these concepts are commonly thought of as simplicity, determinism, linearity, and reversibility. Theorists working within the context of a paradigm (new science) might be thought of as using such concepts as complexity, randomness, non-linearity, and irreversibility.

Simplicity is the act of thinking in terms of linear causality or in direct proportions of equal input and output (a reduction to basic essentials) while

complexity means braided together. The degree and nature of relationships of units is imperfectly known due to constant fluctuations.

Assuming that occurrences in nature or social or psychological phenomena are determined by antecedent causes is deterministic. Attempting to forecast reality under such an assumption further assumes a response or output that is directly proportional to the input or linearity.

An artificial precisely contrived condition would be deterministic and linear, however, as demonstrated by quantum theory, the natural contains essential elements of randomness and non-linearity. Randomness suggests that a definite pattern cannot be predetermined and non-linearity implies that small inputs can trigger massive conditions; the notion of sensitivity to initial conditions (Gleick, 1987; Prigogne & Stengers, 1984).

Reversibility views the world as static, a vast automaton; a Chevy with a stick shift. Whereas, reversible processes remain independent of the direction of time, irreversibility is dependent upon the direction of time (Prigogne & Stengers, 1984). "In reversibility time is reduced to a parameter, and future and past

become equivalent" (p. 11), thus information remains constant in time. Irreversibility is evolutionary in nature and incapable of being reversed. From an evolutionary perspective, there are forces that perturb a system prohibiting its ability to function in a steady, linear fashion. Thus an open system is no more than possible systems that would reflect the interaction with their surroundings (context).

Epilogue

Speculating on the possibilities inherent in a theory/research base void of the limitations of a "Newtonian vision" of reality becomes fascinating. The temptation to embrace novel modes of thought and to establish correspondence with practice is both a shortcoming and strength of curriculum theorists. This is a shortcoming in that a preoccupation with what will work prevails, at the expense of what should and could work; action without reflection. On the other hand an eagerness to plunge ahead into uncharted territories reflects the playful nature of curriculum theorists and their openness to incorporating extraordinary visions into the theorizing function.

Since the content of this article is but a cursory interpretation of the volumes of literature available on the subject, a cautionary note seems important as far as the correspondence and playful aspects of curriculum theorizing are concerned. The very nature of an emerging paradigm is evolutionary in nature, therefore it is in process, constantly unfolding, and therefore does not exist as a static condition. A new vision of reality does not lend itself as much to an act of translation as it does to transformation; a different way of being in the world. From a Newtonian perspective, the tendency is to place the observed and the observer on a continuum and attempt balance. However, from a transformational perspective the observer and observed are not dualistic in nature but simply two parts of the same whole.

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Footnote

[1]We are not using the categories of rational and nonrational in the conventional sense of intellectual vs. nonintellectual. The rational we refer to is limited to the commonsensical; that is, it is based in everyday habits-of-thought that are embedded in fixed laws emerging from a felt and seen reality. On the other hand, the nonrational we speak of is not limited to intuition and feelings, but given to logic and intellect; however, its condition also incorporates the novel which sometimes supercedes the boundaries of imposed cognitive structures. Francis Bacon warned about finding more order and regularity in the world than is really there.